

Low Volume Vehicle Technical Association Incorporated

Low Volume Vehicle Standard 155-30(00) (Frontal Impact)

*This Low Volume Vehicle Standard corresponds with:
Land Transport Rule: Frontal Impact 2001(Rule 32006/1)*

**Original version
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Background

The Low Volume Vehicle Technical Association Incorporated (LVVTA) represents ten hobbyist and specialist groups who are dedicated to ensuring that their members' vehicles, when scratch-built or modified, meet the highest practicable safety standards.

The information in these standards has stemmed from work undertaken by founding member groups that commenced prior to 1990 and has been progressively developed as an integral part of NZ Government safety rules and regulations by agreement and in consultation with the Land Transport Safety Authority.

As a result, the considerable experience in applied safety engineering built up by LVVTA members over the past ten years can be of benefit to members of the NZ public who also wish to build or modify light motor vehicles.

Availability of low volume vehicle standards

Low volume vehicle standards are prepared by the Low Volume Vehicle Technical Association (Inc.) in consultation with the Land Transport Safety Authority of New Zealand.

Low volume vehicle standards are printed and distributed by the Low Volume Vehicle Technical Association (Inc.). Information on the availability of the low volume vehicle standards and their amendments may be obtained by writing to the Low Volume Vehicle Technical Association (Inc.) at the address shown below.

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Frontal Impact

(155-30(00))

Purpose of this standard

The purpose of this low volume vehicle standard is to specify vehicle crashworthiness requirements in order to reduce injuries to occupants in frontal crashes.

Section 1 Scope and application of this standard

1.1 Application of this standard

- 1.1(1) This low volume vehicle standard applies to all light vehicles other than those specified in 1.1(2), that are:
- (a) modified on or after 1 March 1999 in such a way that the performance of any frontal impact protection systems may, directly or indirectly, be affected; or
 - (b) scratch-built on or after 1 April 2003.
- 1.1(2) This low volume vehicle standard does not apply to:
- (a) powered bicycles of Class AB, or light trailers of Class TA or TB; or
 - (b) motorcycles of Class LA, LB, LC, LD, or LE; or
 - (c) those vehicles specified in *section 4*.
- 1.1(3) A light vehicle that is modified or scratch-built as in 1.1(1), becomes a low volume vehicle, and must:
- (a) be certified in accordance with the procedures specified in *chapter 2* of the *Low Volume Vehicle Code*; and
 - (b) unless *section 3* applies, comply with all applicable technical requirements contained in *section 2* of this standard.

NOTE: Certification of a vehicle to the Low Volume Vehicle Code for the removal of airbags, that was carried out prior to the introduction date of this standard, and where a valid Low Volume Vehicle Compliance Plate is fitted, may remain in the configuration described on the compliance plate.

Section 2 Technical requirements of this standard

2.1 General safety requirements

2.1(1) A low volume vehicle must:

- (a) be designed and constructed using materials and components that are fit for their purpose; and
- (b) be safe to be operated on the road.

NOTE: The requirements specified in 2.1(1) are selected from 2.2.1 of Part 2 of the *Low Volume Vehicle Code*, reproduced here in the interest of convenience.

2.1(2) Subject to 2.3(2), 2.3(4) and 2.3(5), the performance of a motor vehicle in relation to protecting occupants in a frontal impact collision must not be reduced below a safe tolerance of its state when manufactured or modified, by any factors, including corrosion, structural damage, material degradation, inadequate repair, the fitting of additional equipment, or the removal of equipment.

2.1(3) In assessing whether the general safety requirements in 2.1(2) have been complied with, a low volume vehicle certifier may take into account:

- (a) the function of the additional equipment fitted to the motor vehicle after manufacture, and the measures taken to minimise the risk of injury from the equipment; and
- (b) evidence that the motor vehicle is within the manufacturer's operating limits.

NOTE: The requirements specified in 2.1(2) and 2.1(3) are the applicable general safety requirements from 2.2 of *Land Transport Rule: Frontal Impact 2001(Rule 32006/1)*, reproduced here in the interest of convenience.

2.2 Technical requirements for modifications, additions, and construction

Modification requirements for production low volume vehicles

- 2.2(1) A production low volume vehicle must not feature any modifications to any crumple zones or other energy-absorbing measure incorporated by the vehicle manufacturer within the frontal impact protection system.
- 2.2(2) A modification to a production low volume vehicle must be carried out in such a way as to:
- (a) minimise any longitudinal stiffening of the vehicle structure forward of the occupant cell; and
 - (b) minimise the risk of deformation of the occupant cell during a frontal impact; and
 - (c) minimise the likelihood of penetration of the engine or transmission into the occupant cell during a frontal impact.

Additional equipment fitted to production low volume vehicles

- 2.2(3) A modified production low volume vehicle that is of Class MA and retro-fitted with a forward-facing auxiliary bar, must if manufactured to comply with an approved frontal impact standard, be fitted only with an auxiliary bar that, when fitted to the make and model of vehicle in question, does not prevent the vehicle from continuing to comply with that frontal impact standard.

NOTE: In order to meet the requirements of 2.2(3), documented evidence must be provided to the certifier to show that the make and model of vehicle to which the bar is fitted has been tested with the bar fitted, and continues to comply with the approved frontal impact standard to which the vehicle was originally manufactured.

- 2.2(4) A modified production low volume vehicle that is of Class MA must not be retro-fitted with a forward-facing auxiliary winch.

NOTE: A vehicle of other than Class MA fitted with a forward-facing auxiliary bar or winch that requires certification to the *Low Volume Vehicle Code* must meet the requirements specified in the *LVVTA Low Volume Vehicle Standard 100-10 (Auxiliary Bars, Racks, and Equipment)*.

Construction requirements for scratch-built low volume vehicles

2.2(5) A scratch-built low volume vehicle must be constructed in such a way as to:

- (a) minimise the likelihood of penetration of the engine, transmission, suspension, body structure or parts into the occupant cell as a result of a frontal collision; and
- (b) maximise the likelihood that the section of the vehicle forward of the occupant cell will progressively absorb impact energy without significant deformation of the occupant cell, either by:
 - (i) featuring design characteristics forward of the occupant cell consistent with those expected of contemporary high volume production vehicles; or
 - (ii) following relevant design and construction principles contained within the applicable section of the appropriate *Low Volume Vehicle Technical Association Incorporated (LVVTA) Member Association Technical Manual*.

2.2(6) A production vehicle chassis incorporated within a scratch-built low volume vehicle must not feature any modifications that increase the longitudinal stiffness of the section of the chassis forward of the occupant cell.

Seatbelt requirements for scratch-built low volume vehicles

2.2(7) A scratch-built low volume vehicle, other than one to which 2.2(8) applies, must be fitted, in the driver's and front outboard occupant's seating positions, with an approved multiple-sensitive emergency-locking retractor lap-and-diagonal seat belt incorporating a web clamp retractor.

2.2(8) A scratch-built low volume vehicle may be fitted with, as part of a complete alternative frontal impact protection system, a four-point harness seatbelt that exceeds the performance requirements of an emergency locking retractor lap and diagonal seatbelt, for the use of the driver and passenger, provided that:

- (a) the vehicle has no more than one row of seats; and

- (b) the seatbelt meets one or more of the approved standards specified in *Schedule 2 of the Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002 (Rule 32011)*; and
- (c) all controls, both essential and non-essential to the driving operation of the vehicle, can be operated by the driver whilst in the normal driving position and with the seatbelt correctly adjusted; and
- (d) a rear-view mirror is fitted to the interior of the vehicle, and one rear-view mirror is fitted externally to each side of the vehicle, all of which comply with the applicable requirements of *LVVTA Low Volume Vehicle Standard 200-30(00) (Rear-view Mirrors)*; and
- (e) a head restraint is fitted for each seating position that complies with the applicable requirements of *LVVTA Low Volume Vehicle Standard 185-40(00) (Head Restraints)*; and
- (f) the interior fittings, controls, and surfaces of the vehicle comply with the applicable requirements of *LVVTA Low Volume Vehicle Standard 155-40(00) (Interior Impact)*; and
- (g) the seatbelt anchorages comply with the applicable requirements of *LVVTA Low Volume Vehicle Standard 175-00(00) (Seatbelt Anchorages)*.

2.3 Technical requirements for removal, temporary disablement, and semi-permanent disablement of airbags

- 2.3(1) Except as provided for in 2.3(2), 2.3(3), and 2.3(4), an airbag fitted as original equipment by the vehicle manufacturer must not be removed or disabled.

Removal of airbags

- 2.3(2) A vehicle fitted by the vehicle manufacturer with an airbag may have the airbag removed, provided that the vehicle has reached 14 years of age or more, and:

- (a) the airbag and its related systems and components are removed by a person who can provide assurance to the low volume vehicle certifier that he or she possesses the necessary skills and experience to carry out the work correctly; and
 - (b) each seating position affected by the removal of an airbag has the seatbelt replaced by a new seatbelt that meets one or more of the approved standards specified in *Schedule 2 of the Land Transport Rule: Seatbelts and Seatbelt Anchorages 2002 (Rule 32011)* that is appropriate for use in a seating position not equipped with an airbag; and
 - (c) any cavity left by the removal of the airbag is filled with a high-density energy-absorbing material; and
 - (d) the removal of the airbag is indicated to the occupant in the affected seating positions by means of:
 - (i) a label which is permanently attached in a prominent location where it is clearly visible to any occupant in the seating position previously protected by the airbag; and
 - (ii) in the case of factory-installed dashboard warning lights or any other symbol which indicates the presence of an airbag or airbags, disabling or removal of the warning light or symbol;
- and
- (e) the current owner, or authorised representative of the owner, has requested that this action take place by completing the *Airbag Removal/Disablement Request Form* of the *Low Volume Vehicle Technical Association Incorporated*; and
 - (f) the vehicle is certified to the *Low Volume Vehicle Code*, and a *low volume vehicle compliance plate* is fitted to the vehicle.

NOTE 1: An airbag must not be removed or disabled as an alternative to replacement when damaged, or potentially damaged by water immersion or deployment during a collision, unless the vehicle is fourteen years of age or older, as provided for in 2.3(2).

NOTE 2: Where information relating to the removal of an airbag and its related systems is available from the vehicle manufacturer, or representative of the manufacturer, that information must be taken into consideration during the removal process.

Temporary disablement of airbags

2.3(3)

A vehicle fitted by the vehicle manufacturer with an airbag may be modified to allow the airbag to be temporarily disabled for special circumstances or needs of the vehicle operator or passengers, provided that:

- (a) the temporary disablement is controlled by a system that either:
 - (i) incorporates a manually-operated switch that when activated disables the airbag, but which is automatically over-ridden causing the airbag to become re-armed each time the vehicle's ignition system is restarted; or
 - (ii) in the case of a four-wheel drive vehicle equipped with a manually-selectable choice of high and low gear ratios, automatically switched to a disabled position when the low ratio is engaged, and remains disabled for the period during which the low ratio remains engaged;

and

- (b) the airbag and its related systems and components are temporarily disabled by a person who can provide assurance to the low volume vehicle certifier that he or she possesses the necessary skills and experience to carry out the work correctly; and
- (c) a warning light is fitted that is clearly visible and indicates the temporary disablement of the airbag to the occupant in the affected seating position; and
- (d) the current owner, or authorised representative of the owner, has requested that this action take place by completing the *Airbag Removal/Disablement Request Form* of the *Low Volume Vehicle Technical Association Incorporated*; and
- (e) the vehicle is certified to the *Low Volume Vehicle Code*, and a *low volume vehicle compliance plate* is fitted to the vehicle.

NOTE 1: The concession provided by 2.3(3) is to allow a permanent modification to be carried out to a motor vehicle for people who have particular circumstances such as transporting small children, pregnancy, or the need to use the vehicle in rough off-road conditions, and as a result, choose to be able to disable one or more airbags as and when required.

NOTE 2: Where information relating to the disabling of an airbag and its related systems is available from the vehicle manufacturer, or representative of the manufacturer, that information must be taken into consideration during the disabling process.

Semi-permanent disablement of airbags

2.3(4) A vehicle fitted by the vehicle manufacturer with an airbag may have the airbag semi-permanently disabled, provided that the airbag disablement is required by a person with a medical disability or physical condition, who could be placed at risk of sustaining a higher degree of injury in the event of an airbag deployment as a result of the disability or condition; and

- (a) a letter is provided from an appropriate health professional or medical expert, which declares the airbag disablement is necessary for the person with the disability or condition; and
- (b) the airbag and its related systems and components are disabled by a person who can provide assurance that he or she possesses the necessary skills and experience to carry out the work correctly; and
- (c) the disablement of the airbag is indicated and is clearly visible to the occupant in the affected seating position by means of a label which is attached in a prominent location; and
- (d) the current owner, or authorised representative of the owner, has requested that this action take place by completing the *Airbag Removal/Disablement Request Form* of the *Low Volume Vehicle Technical Association Incorporated*; and
- (e) the vehicle is certified to the *Low Volume Vehicle Code*, and a valid *LVVTA-approved Authority Card* which specifies 'Semi-permanent Airbag Disablement' is issued for the vehicle.

NOTE 1: Semi-permanent disablement of an airbag may only occur for the duration in which the vehicle is operated, or travelled in, by the person with the medical disability or physical condition. When the vehicle is sold, it must be reinstated back to its original condition, or sold to another person who has the same requirements and meets the same criteria.

NOTE 2: Where information relating to the disabling of an airbag and its related systems is available from the vehicle manufacturer, or representative of the manufacturer, that information must be taken into consideration during the disabling process.

Section 3 Exclusions to this standard

3.1 LVVTA-approved authority card exclusions

A low volume vehicle, for which a valid *Low Volume Vehicle Authority Card* is issued by an LVVTA-approved organisation, that specifies 'Frontal Impact Protection Systems' is issued, is not required to comply with *section 2*.

NOTE 1: A low volume vehicle authority card is only available for a vehicle that is modified for a particular purpose, in order to meet the specific needs of the person nominated on the authority card. Examples of this are vehicles that are temporarily modified for a person with a disability, or to meet motor-sporting regulations.

NOTE 2: The operator of a vehicle for which a LVVTA-approved authority card is issued, must, when requested by an enforcement officer or certifier, produce the authority card for that vehicle.

Section 4 Vehicles that are not required to be certified to this standard

4.1 Vehicles that pre-date legal requirements

A light vehicle is not required to be certified to this standard, if the vehicle was either:

- (a) modified before 1 March 1999 in such a way that the performance of any frontal impact protection system may, directly or indirectly, be affected; or
- (b) scratch-built before 1 April 2003.

4.2 Modifications that do not require certification

A vehicle is not required to be certified to the *Low Volume Vehicle Code*, provided that the safe performance of the vehicle is not compromised, where the only modifications to the vehicle are any one or more of the following items:

- (a) the fitment of additional cosmetic panels or accessories made from fibreglass or other light-weight deformable materials; or

- (b) the fitment of auxiliary lamps, provided that the lamps and their fitment do not breach the general safety requirements of any applicable safety-related legal requirements; or
- (c) the fitment of auxiliary bars or racks, provided that the bars or racks and their fitment do not breach any applicable safety-related legal requirements.

Section 5 Terms and definitions within this standard

Airbag	means a supplementary occupant protection device together with its associated equipment, fitted forward of the front seating positions, that deploys upon impact during a collision and provides a inflatable cushion to protect the occupants from injury as a result of contacting the vehicle structure, fittings, controls, and surfaces.
Auxiliary bar	means a bar that is fitted to a vehicle which is addition to the external equipment provided by the vehicle manufacturer, and typically includes bull bars, nudge bars, and side bars.
Non-rigid energy absorbing material	means a material that is not rigid, but provides impact protection for motor vehicle occupants by absorbing energy, or pressure, without allowing direct contact with the solid surface positioned behind the material.
Occupant cell	means the passenger compartment area of a vehicle in which all vehicle occupants are seated whilst the vehicle is in operation.

NOTE: The terms and definitions found in section 5 are limited to those terms and definitions that are unique to this low volume vehicle standard, and are not contained within the terms and definitions section of the Low Volume Vehicle Code.